What is claimed is:

1. 1. A method for I/Q mismatch calibration in a
2. receiver having an I/Q correction module using parameters A_p
3. and B_p, the method comprising the steps of:
4. generating an analog test signal $x(t)$ containing
5. $\cos(2\pi(f_c + f_T)t)$, where f_c and f_T are predetermined
6. real numbers;
7. applying I/Q demodulation to reduce the central
8. frequency of the signal $x(t)$ by f_c Hz and
9. outputting a demodulated signal $x_{dem}(t)$;
10. converting the analog signal $x_{dem}(t)$ to a digital signal
11. $x_{dem}[n]$ with a preset sampling rate of f_s Hz;
12. sending the signal $x_{dem}[n]$ into the I/Q correction
13. module using parameters A_p and B_p and outputting a
14. corrected signal $w[n]$;
15. obtaining two measures U_1 and U_2 of the corrected
16. signal $w[n]$ where U_1 and U_2 are values indicative
17. of the discrete-Fourier transform of $w[n]$
18. corresponding to frequency $+f_T$ Hz and $-f_T$ Hz,
19. respectively; and
20. updating the parameters A_p and B_p of the I/Q correction
21. module respectively by a first and second
22. function of the two measures U_1 and U_2, and the
23. current values of the parameters A_p and B_p.

1. 2. The method as claimed in claim 1, wherein the I/Q
2. correction module implements a function:
3. $w[n] = A_p \cdot x_{dem}[n] + B_p \cdot x_{dem}^*[n]$,
4. where the superscript * refers to a complex conjugate.

1   3.   The method as claimed in claim 1, wherein the

2   first and second function are respectively:

3    $A_p^{'} = A_p - \mu \cdot B_p^{*} \cdot U_1 \cdot U_2$; and

4    $B_p^{'} = B_p - \mu \cdot A_p^{*} \cdot U_1 \cdot U_2$,

5   where $A_p^{'}$ and $B_p^{'}$ are the updated values, A_p and B_p are

6   the current values, and μ is a preset step size

7   parameter.

1   4.   The method as claimed in claim 1, wherein:

2    $$f_T = \frac{K}{M} f_s,$$

3   where K and M are integers and the measures U_1 and U_2

4   are respectively obtained by:

5    $$U_1 = \frac{1}{M} \sum_{n=0}^{M-1} w[n] \cdot e^{-j2\pi \frac{K}{M} n};\text{ and}$$

6    $$U_2 = \frac{1}{M} \sum_{n=0}^{M} w[n] \cdot e^{j2\pi \frac{K}{M} n}.$$

1   5.   The method as claimed in claim 1 further

2   comprising the step of:

3   normalizing the updated parameters A_p and B_p so that

4   the power of the corrected signal $w[n]$ is the

5   same as that of the digital signal $x_{dem}[n]$.

1   6.   An apparatus for I/Q mismatch calibration of a

2   receiver, comprising:

3   a signal generator generating an analog test signal

4         $x(t)$ containing $\cos(2\pi(f_c + f_T)t)$, where f_c and f_T are

5   predetermined real numbers;

6   a demodulator applying I/Q demodulation to reduce the

7   central frequency of the signal $x(t)$ by f_c Hz and

8   outputting a demodulated signal $x_{dem}(t)$;

9   A/D converters converting the analog signal $x_{dem}(t)$ to a

10   digital signal $x_{dem}[n]$ with a preset sampling rate

11   of f_s Hz;

12   an I/Q correction module using parameters A_p and B_p to

13   compensate I/Q mismatch in the signal $x_{dem}[n]$ and

14   outputting a corrected signal $w[n]$;

15   a dual-tone correlator outputting two measures U_1 and

16   U_2 of the corrected signal $w[n]$ where U_1 and U_2

17   are values indicative of the discrete-Fourier

18   transform of $w[n]$ corresponding to frequency $+f_T$

19   Hz and $-f_T$ Hz, respectively; and

20   a processor implementing the step of:

21   updating the parameters A_p and B_p of the I/Q

22   correction module respectively by a first

23   and second function of the two measures U_1

24   and U_2, and the current values of the

25   parameters A_p and B_p.

1   7.   The apparatus as claimed in claim 6, wherein the

2   processor further implements the step of:

3   normalizing the updated parameters A_p and B_p so that

4   the power of the corrected signal $w[n]$ is the

5   same as that of the digital signal $x_{dem}[n]$.

1   8.   The apparatus as claimed in claim 6, wherein the

2   first and second function are respectively:

3    $A_p^{'} = A_p - \mu \cdot B_p^{*} \cdot U_1 \cdot U_2$; and

4    $B_p' = B_p - \mu \cdot A_p^* \cdot U_1 \cdot U_2$,

5   where A_p' and B_p' are the updated values, A_p and B_p are

6   the current values, and μ is a preset step size

7   parameter.

1   9.   The apparatus as claimed in claim 6, wherein the

2   I/Q correction module implements a function:

3    $w[n] = A_p \cdot x_{dem}[n] + B_p \cdot x_{dem}^*[n]$,

4   where the superscript * refers to a complex conjugate.

1   10.   The apparatus as claimed in claim 6, wherein :

2    $f_T = \dfrac{K}{M} f_s$,

3   where K and M are integers and the measures U_1 and U_2

4   are respectively obtained by:

5    $U_1 = \dfrac{1}{M} \displaystyle\sum_{n=0}^{M-1} w[n] \cdot e^{-j2\pi\frac{K}{M}n}$; and

6    $U_2 = \dfrac{1}{M} \displaystyle\sum_{n=0}^{M} w[n] \cdot e^{j2\pi\frac{K}{M}n}$.